Constellation

One-Time Extension of Completion Time for Standby Gas Treatment System

NRC Pre-Application Meeting

September 24, 2024

Agenda

- Introduction and Opening Remarks
- Objectives
- Background
- Modification Summary
- Temporary Realignment of Standby Gas Treatment (SGT) System Exhaust
- Risk Insights / Risk Management Actions
- Proposed License Amendment Request
- Timeline for Submittal
- Summary

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Objectives

- Brief the NRC on Constellation Energy Generation, LLC's (CEG's) proposed license amendment request for a one-time extension of the SGT system Technical Specifications (TS) Completion Time
- Ensure a common understanding of the proposed change and content of the planned submittal
- Summarize the planned approach for maintaining availability of the SGT system
- Discuss timing of submittal
- Obtain NRC feedback prior to formal submittal

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Background

- On July 4, 2022, Quad Cities Nuclear Power Station (QCNPS) Unit 2 experienced a manual reactor scram due to a Feedwater regulator valve that failed in the closed position and locked up, causing a decrease in reactor water level
- As a result of the scram, the B train of the SGT system automatically started
  - B train experienced degraded and oscillating flow between 2400-2600 cfm (normal flow rate is 3600-4400 cfm)
  - Operations manually secured the B train of the SGT system and started the A train, which also indicated degraded and oscillating flow
  - Troubleshooting identified a partial blockage in the 24-inch common discharge line
  - Flowrate slowly increased as the A train continued to operate
  - LER 2022-003-00 was submitted September 1, 2022, due to the loss of safety function of SGT
- CEG's causal evaluation determined that the cause of the low flow condition on both trains of SGT was due to partial water blockage in the SGT 24-inch common discharge line
- Source of the water intrusion was determined to be from either:
  - Condensation from the Main Chimney exhausts, or
  - Groundwater intrusion from a flaw in the buried common discharge line pipe section
- Immediate corrective actions included running the SGT train until water in the line dissipated to the point where SGT flow returned to normal, and increasing the Frequency of Surveillance Requirement 3.6.4.3.1

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Modification Summary

- CEG plans to install a modification on the buried 24-inch common discharge line pipe section to address the groundwater intrusion concern
- Modification will install a poly urea class IV structural spray in place pipe (SIPP) using a spin cast pipe crawler
- SIPP application on the common discharge line pipe will begin in the Turbine Building, extend for the full length of the underground portion of the pipe, and end just after the last elbow in the main chimney (i.e., total length of approximately 270-feet)
- Installation of the modification will require cutting and temporarily removing a section of the common discharge line pipe in the Turbine Building
  - Provide an access point for the spin cast pipe crawler
  - May require temporarily supporting the left-in-place SGT line end sections
  - Results in both SGT subsystems being declared inoperable under TS 3.6.4.3
- Following completion of the SIPP application, the removed section of pipe will be replaced per the original design, and a final acceptance test will be completed prior to returning the SGT system to operable status
- CEG's preliminary evaluation of the modification in accordance with 10 CFR 50.59 concluded that prior NRC approval of the repair is not required
- However, installation of the modification will result in both SGT subsystems being inoperable for longer than the current TS 3.6.4.3 Required Action D.1 Completion Time of 1 hour

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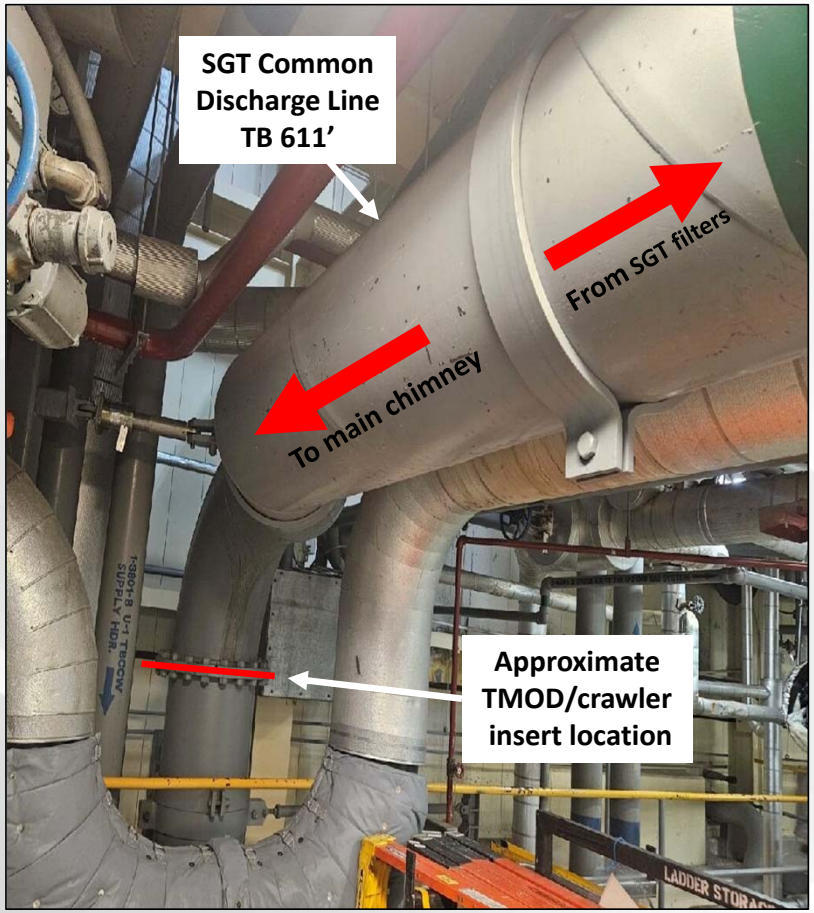
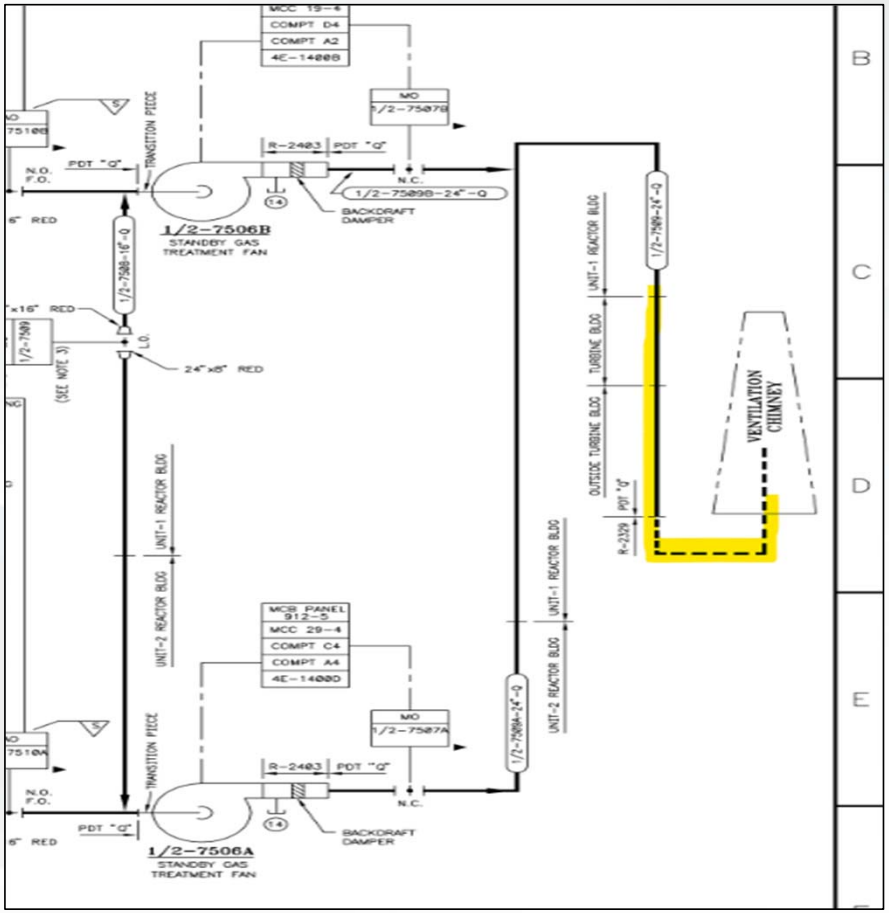
SGT Common Discharge Line





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SIPP Application Project Schedule

Task No.	Project Task	Duration (Hours)	Estimated Start Date	Estimated Finish Date
1	OPS HANG TAG OUTS	8	11/9/25	11/10/25
2	OPS ENTER TS 3.6.4.3 COND D INOP BOTH TRAINS OF SGT	0	11/9/25	11/22/25
3	MMD PERFORM CUTS AND UNBOLTING TO REMOVE PIPE SECTION FOR REPAIRS SGT LINE 1/2-7509-24"	12	11/10/25	11/10/25
4	MMD RIG PIPE SECTION FOR PIPE FLANGE CLEARANCE	4	11/10/25	11/10/25
5	MMD FITUP/TAC WELD PIPE FLANGES	8	11/10/25	11/11/25
6	***CONTINGENT***: MMD PERFORM SCAFFOLD MOD TO SUPPORT PIPE SECTION REMOVAL	8	11/11/25	11/11/25
7	MMD RIG PIPE SECTION FOR PIPE TO FLOOR FOR MODIFICATION	4	11/11/25	11/11/25
8	VN PERFORM INITIAL INSPECTION OF PIPING FOR REPAIRS SGT LINE 1/2-7509-24"	12	11/11/25	11/12/25
9	MMD INSTALL TMOD FOR SGT SYSTEM AVAILABILITY	4	11/12/25	11/12/25
10	OPS TL T/O XXXX SGT LINE 1/2-7509-24" AND PERFORM PMT OF BOTH TRAINS SGT	4	11/12/25	11/12/25
11	OPS BOTH TRAINS OF SGT AVAILABLE	0	11/12/25	11/21/25
12	***CONTINGENT***: VN PERFORM WATER REMOVAL DRYING AS REQUIRED	36	11/12/25	11/14/25
13	***CONTINGENT***: VN PERFORM REPAIRS / PATCH AS REQUIRED TO SGT LINE 1/2-7509-24"	24	11/14/25	11/15/25
14	***CONTINGENT***: END TERMINATION PREPS IF REQUIRED TO SGT LINE 1/2-7509-24"	24	11/15/25	11/16/25
15	VN PERFORM PIPING COATING / REPAIRS TO SGT LINE 1/2-7509-24"	96	11/16/25	11/20/25
16	VN PERFORM INSP OF PIPING AFTER COATING / REPAIRS SGT LINE 1/2-7509-24"	8	11/20/25	11/20/25
17	QC PERFORM INSP OF PIPING AFTER COATING / REPAIRS SGT LINE 1/2-7509-24"	4	11/20/25	11/20/25
18	***CONTINGENT***: VENDOR PERFORM SPOT REPAIRS TO INSTALLED LINER POST INSPECTION	24	11/20/25	11/21/25
19	OPS REHANG T/O XXXX SGT LINE 1/2-7509-24"	4	11/21/25	11/21/25
20	OPS BOTH TRAINS OF SGT UNAVAILABLE	0	11/21/25	11/22/25
21	MMD REMOVE TMOD	4	11/21/25	11/21/25
22	MMD RIG REMOVED PIPING SECTION BACK INTO PLACE	4	11/21/25	11/22/25
23	MMD FIT UP/TORQUE BOLTED CONNECTIONS FOR PIPING SECTION	8	11/22/25	11/22/25
24	OPS F/C T/O XXXX SGT LINE 1/2-7509-24"	4	11/22/25	11/22/25
25	OPS PERFORM PMT OF BOTH TRAINS SGT	4	11/22/25	11/22/25
26	OPS EXIT TS 3.6.4.3 COND D INOP BOTH TRAINS OF SGT	0	11/22/25	11/22/25
TOTAL	**SGT PIPING REPAIR WORK**	**308**	**11/9/2025**	**11/22/2025**

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Temporary Realignment of SGT System Exhaust

- CEG plans to install a temporary modification to minimize, to the extent practical, the time when both SGT subsystems are unavailable
- Intent of the temporary modification is to maintain availability of the SGT system during the rehabilitation of the 24-inch common discharge line
- A temporary discharge line will be routed from the open end of the SGT common discharge line in the Turbine Building to the Turbine Building exhaust ventilation duct, thus providing a flow path from the SGT system charcoal filter trains to the main chimney
- Both SGT subsystems will remain inoperable
  - Temporary discharge line through the Turbine Building exhaust ventilation duct will not meet seismic design requirements
  - A portion of the Turbine Building exhaust ventilation duct is routed outside above ground, thus being susceptible to tornado missiles
- Although inoperable, both SGT subsystems will remain available to provide a filtered flow path to the main chimney for elevated releases in the event of an accident
- Implementation of the temporary modification will require periods of complete unavailability of the SGT system, both when initially connecting the temporary discharge line, and again when restoring the original configuration

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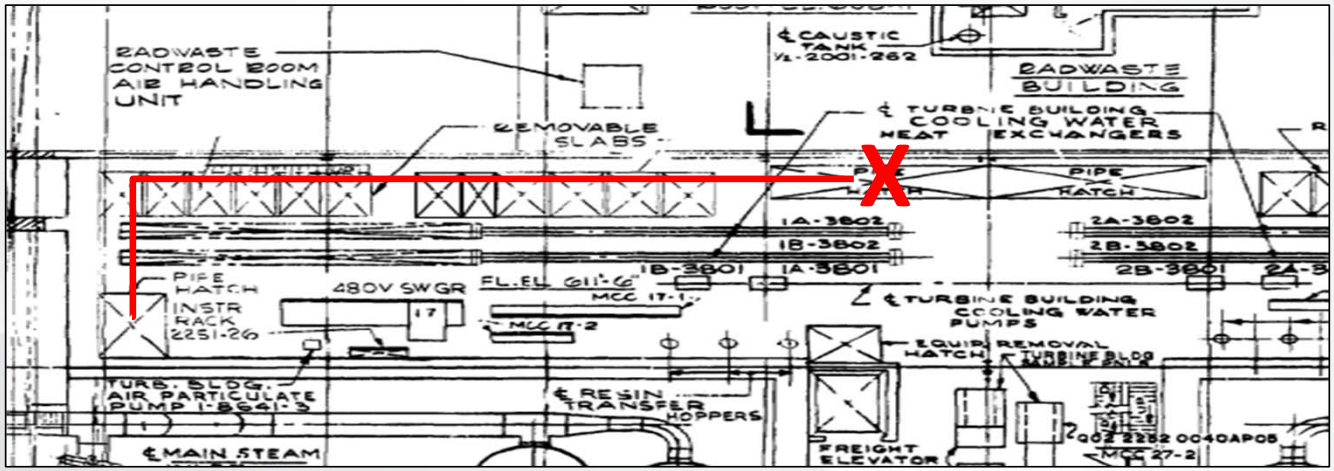
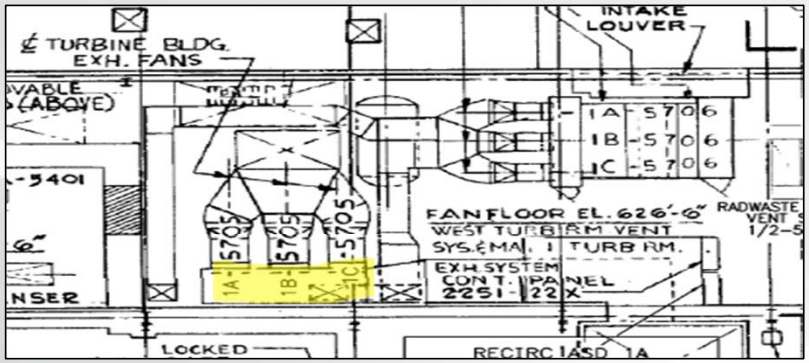
Temporary Discharge Line



X marks location of SGT common discharge line on elevation 611’

Temporary ventilation trunk will run from the SGT line across elevation 611’ to the pipe hatch, then up to the TB ventilation exhaust ductwork on the elevation above (626’)



Highlighted area is on elevation 626’ and shows the TB ventilation exhaust insert location for the temporary ventilation trunk

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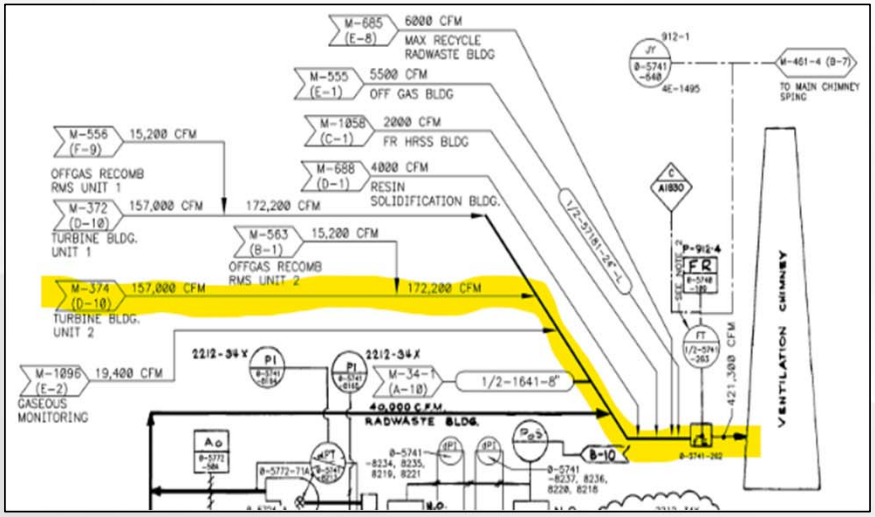
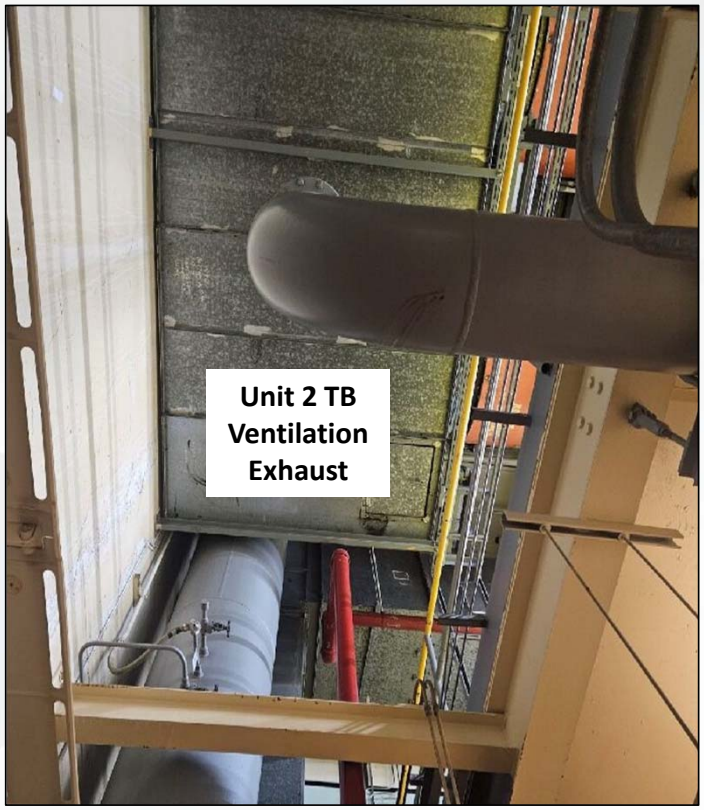
Temporary Discharge Line (cont.)



Unit 2 TB exhaust ventilation flows to the main chimney like the SGT common discharge line.

Right side photo shows the approximate location where the temporary ventilation trunk will connect to the Unit 2 TB exhaust ventilation duct.



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Risk Insights / Risk Management Actions

- Overall low risk associated with the work
- SGT system is not modeled in PRA
  - SGT is considered insufficient to provide adequate containment pressure relief for PRA accident sequences
  - Qualitative Risk Assessment – Type 2 license amendment request
- Credited in UFSAR to mitigate consequences of LOCAs
  - Low frequency of LOCAs during short repair period (14 days)
  - Defense in Depth – Similar systems maintain the SGT containment pressure control function
    - Augmented Primary Containment Venting (APCV)
    - Hardened Containment Vent System (HCVS) [1]
  - Installation of temporary modification will restore SGT to available status for the majority of the work window
- PRA Recommended Compensatory Actions
  - Protect APCV and HCVS
  - Protect SGT temporary modification
  - Limit maintenance activities during duration of the repair
    - Especially those that could potentially lead to an ISLOCA

[1]: HCVS procedurally (QCOP 1600-13) requires prerequisite of ELAP scenarios to be utilized, so the benefit it provides in LOCA scenarios is limited

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Proposed License Amendment Request

- The SGT system at QCNPS consists of two fully redundant subsystems that are shared between Unit 1 and Unit 2, each with its own set of ductwork, dampers, charcoal filter train, and controls
- TS LCO 3.6.4.3 requires two SGT subsystems to be operable in Modes 1, 2, and 3, and during movement of recently irradiated fuel assemblies in the secondary containment
- Condition D applies with two SGT subsystems inoperable in Mode 1, 2, or 3
  - Required Action D.1 is to restore one SGT subsystem to operable status, with a Completion Time of 1 hour
- If one SGT subsystem is not restored to operable status within 1 hour, Condition E requires both units to be in Mode 3 within the following 12 hours
- Proposed license amendment request adds a Note to the Completion Time for Condition D that states:

  Or 14 days, to support the rehabilitation of the 24-inch SGT common discharge line pipe section. The 14 day extended period shall only be used once and may not be used after May 31, 2026. During the extended period, the temporary discharge line that routes the SGT system exhaust through the Turbine Building exhaust ventilation duct, that is described in Attachment 1 of letter RS-24-xxx dated October xx, 2024, shall be in service, except when initially connecting the temporary discharge line and again when restoring the original configuration. If the temporary discharge line becomes unavailable at any time during the extended period, the Required Action is to restore the temporary discharge line within 24 hours or enter Condition E.

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Timeline for Submittal

- Planned submittal of license amendment request to the NRC – October 2024
- Requested approval date will be nine months after submittal (i.e., July 2025)
- Current plan is to install the modification in November 2025
- Any changes to the schedule will be communicated to the NRR Project Manager

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Summary

- CEG plans to install a modification on the buried 24-inch common discharge line pipe section to address the groundwater intrusion concern
- SIPP application repair method does not require prior NRC approval in accordance with 10 CFR 50.59
- Current schedule shows that installation of the modification could result in both SGT subsystems being inoperable for up to 14 days
- One-time extension of the TS 3.6.4.3 Required Action D.1 Completion Time is needed

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